

PO_2_python_way

January 27, 2025

1 P02 Rozkład

```
[76]: import numpy as np
import scipy.stats as stats
import matplotlib.pyplot as plt
import seaborn as sns
```

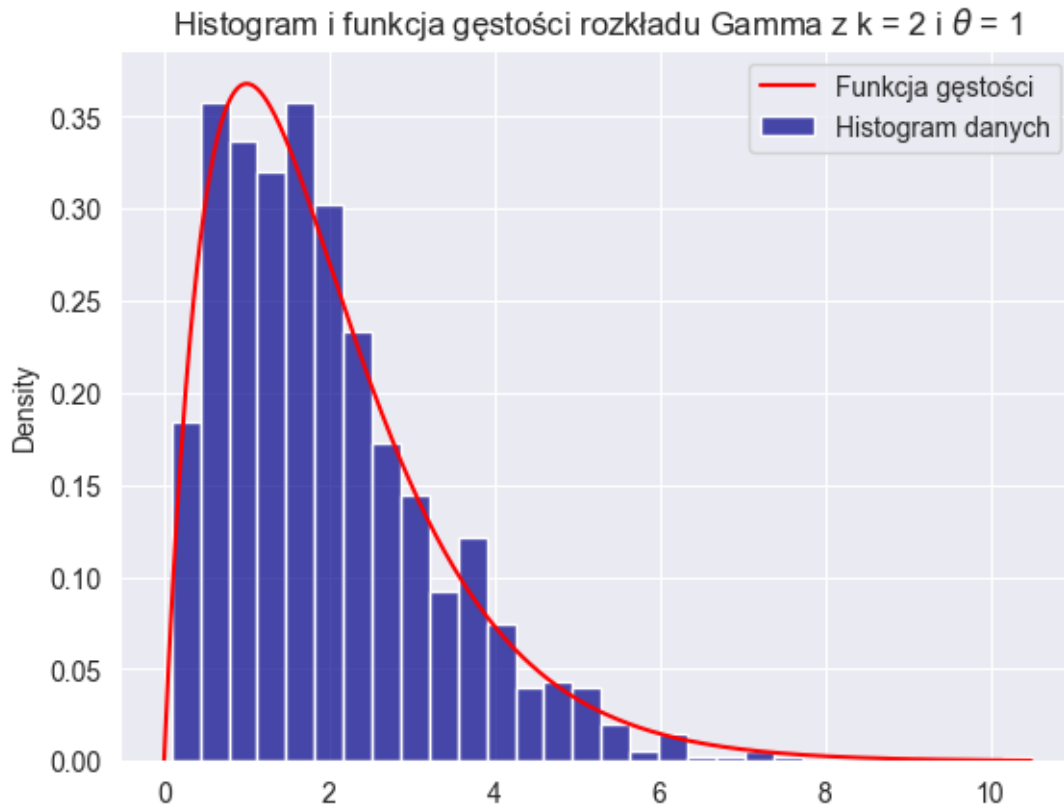
Wykorzystam rozkład gamma jako test statystyczny

```
[77]: k = 2
theta = 1
n = 1000
mean = stats.gamma.mean(k, scale=theta)
sd = stats.gamma.std(k, scale=theta)

data = np.random.gamma(k, theta, n)
x = np.linspace(0, max(data), 1000)
pdf = stats.gamma.pdf(x, k, scale=theta)

sns.histplot(
    data,
    bins=30,
    stat="density",
    color="darkblue",
    label="Histogram danych",
    alpha=0.7,
)
sns.set_style("darkgrid")
sns.lineplot(x=x, y=pdf, label="Funkcja gęstości", color="red")
plt.title(
    f"Histogram i funkcja gęstości rozkładu Gamma z k = {round(k,2)} i  $\theta$  = {round(theta,2)}"
)
plt.legend()
plt.show()
```

<IPython.core.display.HTML object>



2 FAJNO

```
[78]: z_values = []
s = 10000
n = 1000
for _ in range(s):
    sample = np.random.gamma(k, theta, n)
    sample_mean = np.mean(sample)
    z = np.sqrt(n) * (sample_mean - mean) / sd
    z_values.append(z)
z_values = np.array(z_values)
x = np.linspace(-4, 4, 1000)
normal_pdf = stats.norm.pdf(x, 0, 1)
sns.histplot(
    z_values, bins=30, stat="density", color="darkblue", label="Histogram Zn",
    alpha=0.7
)
sns.set_style("darkgrid")
sns.lineplot(x=x, y=normal_pdf, label="Gęstość N(0,1)", color="red")
plt.title("Histogram Zn i gęstość N(0,1)")
```

```
plt.legend()  
plt.show()
```

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